Michigan Department of Environmental Quality
COOPERATING TECHNICAL PARTNERS
MAPPING ACTIVITY STATEMENT

Mapping Activity Statement No. 2003-M1 – Digital Flood Insurance Rate Map Production and Development of Updated Flood Data

In accordance with the Cooperating Technical Partners (CTP) Partnership Agreement dated January 12, 2001 between the Michigan Department of Environmental Quality (MDEQ) and the Federal Emergency Management Agency (FEMA), Mapping Activity Statement (MAS) No. 2003-M1 is as follows.

SECTION 1—OBJECTIVE AND SCOPE

The objective of the Flood Map Project documented in this MAS is to develop a Digital Flood Insurance Rate Map (DFIRM) and Flood Insurance Study (FIS) report for the City of Bridgman, Berrien County. The DFIRM and FIS report will be produced in the FEMA Countywide Format as part of the FY03 Berrien County DFIRM Production project.

In addition, the Mapping Partners involved in this project will develop new and/or updated flood hazard data, as summarized in the table below.

Flooding Source	Reach Limits	Hydrologic Analyses	Hydraulic Analyses	Floodplain Mapping
Tanner Creek	Mouth at Lake Michigan upstream to the northern city limits	X	X	X
Bedortha Drain	Confluence with Tanner Creek to Rambo Road	X	X	X
Bridgman City Drain	Confluence with Bedortha Drain to eastern city limits	X	X	X

This Flood Map Project will be completed by the following parties:

- MDEQ;
- FEMA or their designated Flood Map Production Coordination Contractor (FEMA).

The activities for this Flood Map Project, including required Quality Assurance/Quality Control (QA/QC) reviews, and the Mapping Partners that will complete them are summarized in the table below. The

sections of this MAS that follow the table below describe the specific activities, responsible Mapping Partner(s), FEMA standards that must be met, and resultant map components.

Activities	CTP	FEMA (MCC/ IDIQ)
Activity 1 – Field Surveys and Reconnaissance	x	
Activity 2 – Topographic Data Development	x	
Activity 3 – Independent QA/QC Review of Topographic Data		x
Activity 4 –Hydrologic Analyses	x	
Activity 5–Independent QA/QC Review of Hydrologic Analyses		x
Activity 6 – Hydraulic Analyses	x	
Activity 7 – Independent QA/QC Review of Hydraulic Analyses		x
Activity 8 – Floodplain Mapping (Detailed Riverine or Coastal Analysis)	x	
Activity 9 – Independent QA/QC Review of Floodplain Mapping		x
Activity 10 – Base Map Acquisition		x
Activity 12 – DFIRM Production		x
Activity 12A – Application of DFIRM Graphic and Database Specifications		x
Activity 12B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphic and Database Specifications		x
Activity 13 – Preliminary DFIRM and FIS Report Distribution		x

Activity 1 - Field Surveys and Reconnaissance

Responsible Mapping Partner: MDEQ

Scope: To supplement any field reconnaissance conducted during the Project Scoping phase of this project, the MDEQ shall conduct a detailed field reconnaissance of the specific study area to determine conditions along the floodplain(s), types and numbers of hydraulic and/or flood-control structures, apparent maintenance or lack thereof of existing hydraulic structures, locations of cross sections to be surveyed, and other parameters needed for the hydrologic and hydraulic analyses. Data and information from the existing FIS for the City of Bridgman will be evaluated and used wherever possible.

In addition to the initial field reconnaissance, the MDEQ shall conduct field surveys, including obtaining channel and floodplain cross sections, identifying or establishing Temporary Bench Marks, and obtaining the physical dimensions of hydraulic and flood-control structures.

Standards: All work under Activity 1 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the Technical Support Data Notebook (TSDN) format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MDEQ shall make the following products available to FEMA :

- A report summarizing the findings of the field reconnaissance;
- Maps and drawings that provide the detailed survey results; and
- Survey notebook containing cross sections and structural data.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 2 - Topographic Data Development

Responsible Mapping Partner: MDEQ

Scope: To supplement the field surveys conducted under Activity 1, the MDEQ shall obtain additional topographic data of the overbank areas of the flooding sources studied to delineate floodplain boundaries. Specifically, the MDEQ shall generate new topographic data for the studied streams using information available from the City of Bridgman and Berrien County. The MDEQ also shall coordinate with other team members conducting field surveys under Activity 1. Contour interval and/or accuracy for the topographic data shall be selected based on the current FEMA requirements as documented in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

For this activity, the MDEQ also shall develop topographic maps and/or Digital Elevation Models for the subject flooding sources using the data collected under Activities 1 and 2. In addition, the MDEQ shall address all concerns or questions regarding Activity 2 that are raised by FEMA during the independent QA/QC review under Activity 3.

Standards: All work under Activity 2 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of topographic data collection and processing for the studied streams, the MDEQ shall submit these data to FEMA for an independent QA/QC review under Activity 3. The MDEQ shall submit data for the remaining flooding sources for a final QA/QC review at the completion of this activity.

In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MDEQ shall make the following products available to FEMA:

- Hardcopy topographic maps;
- Report summarizing methodology and results;

- Mass points and breaklines data on CD-ROM;
- Digital work maps with contours;
- Checkpoint analyses to assess the accuracy of data, including Root Mean Square Error calculations to support vertical accuracy;
- Identification of remote-sensing data voids and methods used to supplement data voids;
- National Geodetic Survey data sheets for Network Control Points used to control remote- sensing and ground surveys; and
- Metadata compliant with Federal Geographic Data Committee standards.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 3 - Independent QA/QC Review of Topographic Data

Responsible Mapping Partner: FEMA

Scope: FEMA shall review the mapping data generated by the MDEQ under Activity 2 to ensure that these data are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM.

Standards: All work under Activity 3 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Activity 4 – Hydrologic Analyses

Responsible Mapping Partner: MDEQ

Scope: the MDEQ shall perform hydrologic analyses for approximately three (3) square miles of drainage area for the flooding source(s) listed earlier in this MAS. The MDEQ shall calculate peak flood discharges for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events using the HEC-HMS computer program. These flood discharges will be the basis for subsequent hydraulic analyses under Activity 6. In addition, the MDEQ shall address all concerns or questions regarding Activity 4 that are raised during the independent QA/QC review performed by FEMA under Activity 5.

If Geographic Information System (GIS)-based modeling is used, the MDEQ shall document automated data processing and modeling algorithms and provide them to FEMA to ensure they are consistent with the standards outlined above. Digital datasets (such as elevation, basin, or land use data) are to be documented and provided to FEMA for approval before performing the hydrologic analyses to ensure the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analysis, then the MDEQ shall provide full user documentation, technical algorithm documentation, and the software to FEMA for review before performing the hydrologic analyses.

Standards: All work under Activity 4 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of hydrologic modeling for Tanner Creek, the MDEQ shall submit the results to FEMA for an independent QA/QC review under Activity 5. The MDEQ shall submit the results of the hydrologic analyses for the remaining flooding sources for a final QA/QC review at the completion of this activity.

In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MDEQ shall make the following products available to FEMA:

- Digital copies of all hydrologic modeling (input and output) files for the 10-, 2-, 1-, and 0.2-percent-annual-chance storm events;
- Digital and hardcopy versions of the Summary of Discharges Table presenting discharge data for the flooding sources for which hydrologic analyses were performed;
- Digital and hardcopy versions of draft text for Section 3.1, Hydrologic Analyses, of the FIS report; and
- Digital and hardcopy versions of all backup data used in the analysis, including work maps.

For GIS-based modeling, deliverables shall include all input and output data, intermediate data processing products, and GIS data layers.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 5 - Independent QA/QC Review of Hydrologic Analyses

Responsible Mapping Partner: FEMA

Scope: FEMA shall review the technical, scientific, and other information submitted by the MDEQ under Activity 4 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to prepare the DFIRM. This work shall include, at a minimum, the activities listed below.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review is to focus on the following:
  - Use of acceptable models;
  - Use of appropriate methodology(ies);
  - Correctly applied methodology(ies)/model(s), including QC of input parameters;
  - Comparison with gage data and/or regression equations, if appropriate; and
  - Comparison with discharges for contiguous reaches or flooding sources.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.

- Maintain an archive of all data submitted for hydrologic modeling review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

Standards: All work under Activity 5 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Activity 6 – Hydraulic Analyses

Responsible Mapping Partner: MDEQ

Scope: The MDEQ shall perform hydraulic analyses for approximately 3.5 miles of the flooding sources listed earlier in this MAS. The modeling will include the 10-, 2-, 1-, and 0.2-percent-annual-chance events based on peak discharges computed under Activity 4. The hydraulic methods used for this analysis will include a step-backwater analysis using the HEC-RAS computer program.

The MDEQ shall use the cross-section and field data collected under Activity 1 to perform the hydraulic analyses. The hydraulic analyses will be used to establish flood elevations and regulatory floodways for the subject flooding sources.

The MDEQ shall use the FEMA CHECK-RAS checking program to check the reasonableness of the hydraulic analyses. To facilitate the independent QA/QC review under Activity 7, the MDEQ shall provide explanations for unresolved messages from the CHECK-2 or CHECK-RAS program, as appropriate. In addition, the MDEQ shall address all concerns or questions regarding Activity 6 that are raised by FEMA during the independent QA/QC review under Activity 7.

The MDEQ shall document automated data processing and modeling algorithms for GIS-based modeling and provide them to FEMA for review to ensure they are consistent with the standards outlined above. Digital datasets are to be documented and provided to FEMA for approval before performing the hydraulic analyses to ensure the datasets meet minimum requirements. If non-commercial (i.e., custom-developed) software is used for the analyses, then the MDEQ shall provide full user documentation, technical algorithm documentation, and software to FEMA for review before performing the hydraulic analyses

Standards: All work under Activity 6 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of hydraulic modeling for the studied streams, the MDEQ shall submit the results to FEMA for an independent QA/QC review under Activity 7. The MDEQ shall submit the results of the hydraulic analyses for the remaining flooding sources for a final QA/QC review at the completion of this activity.

In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MDEQ shall make the following products available to FEMA:

- Digital profiles of the 10-, 2-, 1- and 0.2-percent-annual-chance water-surface elevations representing existing conditions using the FEMA RASPLOT program or similar software;
- Digital and hardcopy versions of the Floodway Data Table for each flooding source that is compatible with the DFIRM database;
- Digital and hardcopy versions of all hydraulic modeling (input and output) files;
- Digital and hardcopy versions of table with range of Manning's "n" values;
- Explanations for unresolved messages from the CHECK-RAS program, as appropriate;
- Digital and hardcopy versions of all backup data used in the analyses;

- Digital and hardcopy versions of draft text for inclusion in the FIS report.

For GIS-based modeling, deliverables include all input and output data, intermediate data processing products, GIS data layers, and final products in the format of the DFIRM database structure.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 7 - Independent QA/QC Review of Hydraulic Analyses

Responsible Mapping Partner: FEMA

Scope: FEMA shall review the technical, scientific, and other information submitted by the MDEQ under Activity 6 to ensure that the data and modeling are consistent with FEMA standards and standard engineering practice and are sufficient to revise the FIRM. This work shall include, at a minimum, the activities listed below.

- Review the submittal for technical and regulatory adequacy, completeness of required information, and supporting data and documentation. The technical review is to focus on the following:
  - Use of acceptable model(s);
  - Starting water-surface elevations;
  - Cross-section geometry;
  - Manning's "n" values and expansion/contraction coefficients;
  - Bridge and culvert modeling;
  - Flood discharges;
  - Regulatory floodway computation methods; and
  - Tie-in to upstream and downstream non-revised Flood Profiles.
- Use the CHECK-2 or CHECK-RAS program as appropriate to flag potential problems and focus review efforts.
- Maintain records of all contacts, reviews, recommendations, and actions and make them readily available to FEMA.
- Maintain an archive of all data submitted for hydraulic modeling review. (All supporting data must be retained for 3 years from the date funding recipient submits its final expenditure report to FEMA.)

Standards: All work under Activity 7 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Activity 8 - Floodplain Mapping

Responsible Mapping Partner: MDEQ

Scope: The MDEQ shall delineate the 1- and 0.2-percent-annual-chance floodplain boundaries and the regulatory floodway boundaries (if required) for the flooding sources for which detailed hydrologic, and/or hydraulic, and/or coastal analyses were performed. The MDEQ shall incorporate all new or revised hydrologic, hydraulic, and/or coastal modeling and shall use the topographic data acquired under Activity 2 to delineate the floodplain and regulatory floodway boundaries on a digital work map. In addition, The MDEQ shall incorporate the results of all effective Letters of Map Change (LOMCs) within the revised areas as appropriate. Also, the MDEQ shall address all concerns or questions regarding Activity 8 that are raised by FEMA during the independent QA/QC review under Activity 9.

Standards: All work under Activity 8 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: Upon completion of floodplain mapping for the studied streams, the MDEQ shall submit the results to FEMA for an independent QA/QC review under Activity 9. The mapping for the remaining flooding sources is to be submitted for a final QA/QC review at the completion of this activity.

In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MDEQ shall make the following products available to FEMA:

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale;
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM;
- Any backup or supplemental information used in the mapping required for the independent QA/QC review outlined under Activity 9; and
- An explanation for the use of existing topography for the studied reaches, if appropriate.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 9 - Independent QA/QC Review of Floodplain Mapping

Responsible Mapping Partner: FEMA

Scope: FEMA shall review the floodplain mapping submitted by the MDEQ under Activity 8 to ensure that the results of the analyses performed are accurately represented. This work shall include, at a minimum, the activities listed below.

- Review the cross sections for proper location and orientation on the work map and agreement with the Floodway Data Table.
- Review the BFEs shown on the work map for proper location and agreement with the results of the hydraulic modeling.
- Review the regulatory floodway widths for agreement with the widths shown in the Floodway Data Table and the results of the hydraulic modeling.
- Review the floodplain boundaries for agreement with the flood elevations shown in the Floodway Data Table and the contour lines and other topographic information shown on the work maps.
- Review the floodplain widths at cross sections as shown on the work maps to ensure they match the Floodway Data Table.
- Review the floodplain boundaries as shown on the work maps to ensure they match the Flood Profiles.
- Review the flood insurance risk zones as shown on the work maps to ensure they are labeled properly.
- Review the DFIRM mapping files to ensure they were prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- Review the metadata files to ensure they include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Standards: All work under Activity 9 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Activity 10 - Base Map Acquisition

Responsible Mapping Partner: MDEQ

Scope: Activity 10 consists of obtaining the digital base map, consisting of digital orthography, for the project. The MDEQ shall provide the digital base map. The required activities are as follows:

- Obtain digital files (raster or vector) of the base map.
- Secure necessary permissions from the map source to allow FEMA's use and distribution of hardcopy and digital map products using the digital base map, free of charge.
- Certify that the digital data meets the minimum standards and specifications that FEMA requires for DFIRM production.
- Populate the DFIRM database with the information required by FEMA.

Standards: All work under Activity 10 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MDEQ shall make the following products available to FEMA:

- Written certification that the digital data meet the minimum standards and specifications and
- Documentation that FEMA can use the digital base map.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 12 –DFIRM Production

Responsible Mapping Partner: FEMA

Scope: Upon completion of the floodplain mapping activities, FEMA shall merge the digital floodplain data into Berrien County Countywide DFIRM, which will be concurrently produced. FEMA also shall tie in the Flood Profiles, floodplain boundaries, and regulatory floodway boundaries with contiguous communities that were not studied as part of the Flood Map Project documented in this MAS. FEMA shall coordinate with the MDEQ, as necessary, to resolve any potential tie-in issues.

Standards: All work under Activity 12 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners*, the MDEQ shall make the following products available to FEMA:

- Digital work maps showing the 1- and 0.2-percent-annual-chance floodplain boundary delineations, regulatory floodway boundary delineations, cross sections, BFEs, flood insurance risk zone labels, and all applicable base map features;
- DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*;
- Complete set of plots of DFIRM panels showing all detailed flood hazard information at a suitable scale; and
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM.

Appendix M may be downloaded from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf.

Activity 12A – DFIRM Production (Application of DFIRM Graphics and Database Specifications)

Responsible Mapping Partner: FEMA

Scope: FEMA shall apply the final FEMA DFIRM graphic and database specifications to the DFIRM files produced under Activity 12. This work shall include adding all required annotation, line pattern, area shading, and map collar information (e.g., map borders, title blocks, legends, notes to user). FEMA shall coordinate with the MDEQ, as necessary, to resolve any problems that are identified during Activity 12A.

Standards: All work under Activity 12A shall be performed in accordance with the standards specified in Section 5 of this MAS.

Activity 12B – Independent QA/QC Review of DFIRM Product Meeting FEMA Graphics and Database Specifications

Responsible Mapping Partner: FEMA

Scope: Upon completion of the floodplain mapping activities and DFIRM production activities, FEMA shall review the DFIRM to ensure it meets current graphic specifications. In addition, FEMA shall review the DFIRM spatial database to determine if it meets current database specifications. FEMA shall coordinate with the MDEQ, as necessary, to resolve any problems identified during this QA/QC review. This work shall ensure that the requirements below are met.

- All required DFIRM features are accurately and legibly labeled and follow the examples shown in the FEMA DFIRM specifications. This includes all flood insurance risk zones, BFEs, cross sections, studied streams, mapped political entities, and all roads within and adjacent to the 1-percent-annual-chance floodplains.
- All DFIRM features are correctly symbolized with the appropriate symbol, line pattern, or area shading and follow the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- All map collar information is complete, correct, and follows the requirements specified in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- DFIRM mapping files are in one of the GIS file and database formats specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those specifications for content and attribution.
- DFIRM database files are in one of the database formats specified in FEMA's *Guidelines and Specifications for Flood Hazard Mapping Partners* and conform to those specifications for content and attribution.
- Metadata files describing the DFIRM data include all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*.
- The FIS report is prepared in the FEMA Countywide Format as documented in Appendix J of *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Standards: All work under Activity 12B shall be performed in accordance with the standards specified in Section 5 of this MAS.

Activity 13 - Preliminary DFIRM and FIS Report Distribution

Responsible Mapping Partners: FEMA

Scope: Activity 13 consists of the final preparation, review, and distribution of the Preliminary copies of the DFIRM and FIS report for community official and general public review and comment. The activities to be performed are summarized below.

Preliminary Transmittal Letter Preparation. FEMA shall prepare letters to transmit the Preliminary copies of the DFIRM and FIS report and related enclosures to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as required.

Final QA/QC Review of Preliminary DFIRM and FIS Report: FEMA shall perform a final QA/QC review of the Preliminary DFIRM and FIS report, including all data tables, Flood Profiles, and other components of the FIS report. The QA/QC review procedures shall be consistent with the *Guidelines and Specifications for Flood Hazard Mapping Partners*.

Discrepancy Resolution: FEMA shall work with the MDEQ to resolve discrepancies identified during the final QA/QC review.

Distribution of Preliminary DFIRM and FIS Report: FEMA shall distribute the Preliminary copies of the DFIRM and FIS report to all affected communities, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as required.

News Release Preparation: FEMA shall prepare news release notifications of BFE changes for all affected communities if appropriate and perform QA/QC reviews of the notices for accuracy and compliance with FEMA format requirements. FEMA shall file the notifications for later review.

Preliminary Summary of Map Actions (SOMA) Preparation: FEMA shall prepare Preliminary SOMAs for all affected communities if appropriate. The SOMA shall list pertinent information regarding LOMCs that will be affected by the issuance of the DFIRM (i.e., superseded, incorporated, revalidated).

Standards: All work under Activity 13 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners* and the requirements documented in Section 1 and Appendix A of the FEMA *Document Control Procedures Manual.* The MCC shall make the products listed below available to FEMA.

- Preliminary transmittal letters shall be prepared. These letters and any additional letters requested by FEMA shall be prepared in accordance with the current version of the FEMA *Document Control Procedures Manual.*

- Preliminary copies of the DFIRM and FIS report, including all updated data tables and Flood Profiles shall be mailed to the Chief Executive Officer (CEO) and floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

- Preliminary SOMAs, prepared in accordance with FEMA requirements, shall be provided as appropriate.
- Revised DFIRM mapping files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM.
- Revised DFIRM database files, prepared in accordance with the requirements in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM.
- Revised metadata files describing the DFIRM data, including all required information shown in *Guidelines and Specifications for Flood Hazard Mapping Partners*, shall be provided on CD-ROM.
- A Summary Report that describes and provides the results of all automated or manual QA/QC review steps taken during the preparation of the DFIRM shall be provided.

Activity 14 - Post-Preliminary Processing

Responsible Mapping Partners: MDEQ and FEMA (MCC)

Scope: Activity 14 consists of finalizing the DFIRM and FIS report after the Preliminary copies of the DFIRM and FIS report have been issued to community officials and the public for review and comment. The activities to be performed are summarized below.

Initiation of Statutory 90-Day Appeal Period: When required, upon completion of a 30-day community comment period and/or final coordination meeting with the affected communities, the MCC and the MDEQ shall arrange for and verify that the following activities are completed in accordance with the current version of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* and *Document Control Procedures Manual*:

- Proposed BFE determination letters are sent to the community CEOs and floodplain administrators.
- News release notifications of BFE changes are published in prominent newspapers with local circulation.
- The appropriate notices (Proposed Rules) are published in the *Federal Register*.

Resolution of Appeals and Protests: The MCC and the MDEQ shall support FEMA in reviewing and resolving appeals and protests received during the 90-day appeal period. For each appeal and protest, the following activities shall be conducted as appropriate:

- Initial processing and acknowledgment of submittal;
- Technical review of submittal;
- Preparation of letter(s) requesting additional supporting data;
- Performance of revised analyses; and

- Preparation of a draft resolution letter and revised DFIRM and FIS report materials for FEMA review.

The MCC shall mail all associated correspondence upon authorization by FEMA.

Preparation of Special Correspondence: The MCC and the MDEQ shall support FEMA in responding to comments not received within the 90-day appeal period (referred to as "special correspondence"), including drafting responses for FEMA review when appropriate and finalizing responses when requested by FEMA. The MCC also shall mail the final correspondence (and enclosures if appropriate) and distribute appropriate copies of the correspondence and enclosures upon receipt of authorization from FEMA.

Revision of FIRM and FIS Report: If necessary, the MCC and the MDEQ shall work together to revise the DFIRM and FIS report at the direction of the FEMA Regional Project Officer and distribute Revised Preliminary copies of the DFIRM and FIS report to the CEO and floodplain administrator of each affected community, all other Project Team members, the State NFIP Coordinator, the FEMA Regional Office, and others as directed by FEMA.

Final SOMA Preparation: The MCC shall prepare Final SOMAs for the affected communities as appropriate.

Processing of Letter of Final Determination: The MCC and the MDEQ shall work with FEMA to establish the effective date for the DFIRM and FIS report, and shall prepare a Letter of Final Determination (LFDs) for each affected community for FEMA review in accordance with the FEMA *Document Control Procedures Manual*. The MCC also shall mail the final signed LFDs and enclosures and distribute appropriate copies of the signed LFDs and enclosures upon receipt of authorization from FEMA.

Processing of Final DFIRM and FIS Report for Printing: The MCC shall prepare final reproduction materials for the DFIRM and FIS report and provide these materials to the FEMA Map Service Center for printing by the U.S. Government Printing Office. The MCC also shall prepare the appropriate paperwork to accompany the DFIRM and FIS report (including Print Processing Worksheet, Printing Requisition Forms, and Community Map Actions Form) and transmittal letters to the community CEOs.

Revalidation Letter Processing. The MCC shall prepare and distribute letters to the community CEOs and floodplain administrators to notify the affected communities about LOMCs for which determinations will remain in effect after the DFIRM and FIS report become effective.

Archiving Data: The MCC shall ensure that technical and administrative support data are packaged in the FEMA required format and stored properly in the library archives until they are transmitted to the FEMA Engineering Study Data Package Facility.

Standards: All work under Activity 14 shall be performed in accordance with the standards specified in Section 5 of this MAS.

Deliverables: In accordance with the TSDN format described in described in Appendix M of *Guidelines and Specifications for Flood Hazard Mapping Partners* and the requirements documented in Section 1 and Appendix A of the FEMA *Document Control Procedures Manual*, the MCC and the MDEQ shall make the following products available to FEMA:

- Documentation that the news releases were published in accordance with FEMA requirements;

- Documentation that the appropriate *Federal Register* notices (Proposed and Final Rules) were published in accordance with FEMA requirements;
- Draft and final Special Correspondence (and all associated enclosures, backup data, and other related information) for FEMA review and signature as appropriate;
- Draft and final Appeal and Protest acknowledgment, additional data, and resolution letters (and all associated enclosures, backup data, and other related information) for FEMA review and signature as appropriate;
- Draft and final LFDs (and all associated enclosures, backup data, and other related information) for FEMA review and signature;
- DFIRM negatives and final FIS report materials, including all updated data tables and Flood Profiles;
- Paperwork for the final DFIRM and FIS report materials;
- Transmittal letters for the printed DFIRM and FIS report;
- LOMC Revalidation Letters if appropriate; and
- Complete, organized archived technical and administrative support data

SECTION 2—TECHNICAL AND ADMINISTRATIVE SUPPORT DATA SUBMITTAL

The Project Team members for this Flood Map Project that have responsibilities for activities included in this MAS shall comply with the data submittal requirements summarized below.

All supporting documentation for the activities in this Mapping Activity Statement shall be submitted in the TSDN format in accordance with Appendix M of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners*, dated February 2002. Appendix M is available for viewing or download on the FEMA Web site at http://www.fema.gov/pdf/fhm/frm_gsam.pdf. Table 2-1 indicates the sections of the TSDN that apply to each mapping activity.

If any issues arise that could affect the completion of an activity within the proposed scope or budget, the responsible Mapping Partner shall complete a Special Problem Report (SPR) as soon as possible after the issue is identified and submitted to FEMA. The SPR is to describe the issue and propose possible resolutions. (For additional information on SPRs, refer to Appendix M, Subsection M.2.1.1 of *Guidelines and Specifications for Flood Hazard Mapping Partners*.)

Additionally, the MCC shall collect and maintain a set of products for all Activities and shall compile a comprehensive TSDN for the entire project.

Table 2-1. Mapping Activities and Applicable TSDN Sections

TSDN Section	Mapping Activities													
	1	2	3	4, 4A	5, 5A	6	7	8, 8A, 8B	9	10	11, 11A	12, 12A	13	14
General Documentation														
Special Problem Reports	X			X	X	X	X	X	X	X	X	X	X	X
Telephone Conversation Reports	X			X	X	X	X	X	X	X	X	X	X	X
Meeting Minutes/Reports	X			X	X	X	X	X	X	X	X	X	X	X
General Correspondence	X			X	X	X	X	X	X	X	X	X	X	X
Engineering Analyses														
Hydrologic Analyses	X			X	X	X	X	X	X					
Hydraulic Analyses	X			X	X	X	X	X	X					
Key to Cross-Section Labeling	X			X	X	X	X	X	X					
Key to Transect Labeling	X			X	X	X	X	X	X					
Draft FIS Report				X	X	X	X							
Mapping Information								X	X	X	X	X	X	X
Miscellaneous Reference Information	X			X	X	X	X	X	X	X	X	X	X	X

SECTION 3—PERIOD OF PERFORMANCE

The mapping activities outlined in this MAS will begin on October 1, 2003, and will be completed no later than September 30, 2004. The mapping activities may be terminated at the option of FEMA or the MDEQ in accordance with the provisions of the Partnership Agreement dated January 12, 2001.

SECTION 4—FUNDING/COST-SHARING

SECTION 5—STANDARDS

The standards relevant to this Mapping Activity Statement are provided in Tables 5-1 and 5-2. Information on the correct volume, appendix, section, or subsection of the FEMA *Guidelines and Specifications for Flood Hazard Mapping Partners* to be referenced for each mapping activity are summarized in Table 5-2.

These Guidelines are available for viewing or download from the FEMA Flood Hazard Mapping Web site at http://www.fema.gov/fhm/dl_cgs.shtm.

Table 5-1. Applicable Standards for Project Activities

Applicable Standards	Activities													
	1	2	3	4, 4A	5, 5A	6	7	8, 8A, 8B	9	10	11, 11A	12, 12A	13	14
Guidelines and Specifications for Flood Hazard Mapping Partners, February 2002	X			X	X	X	X	X	X	X	X	X	X	X
American Congress on Surveying and Mapping (ACSM) procedures	X													
Global Positioning System (GPS) Surveys: National Geodetic Survey (NGS-58), "Guidelines for Establishing GPS-Derived Ellipsoid Heights," November 1997	X													
EM 1000-1-1000, *Photogrammetric Mapping*, March 31, 1993	X													
EM 1110-2-1003, *Hydrographic Surveys*, October 31, 1994	X													
Numerical Models Accepted by FEMA for NFIP Usage, January 11, 2002				X	X	X	X							
Content Standards for Digital Geospatial Metadata (Federal Geographic Data Committee, 1998)								X	X	X	X	X	X	X
Document Control Procedures Manual, December 2000												X	X	X

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
1	Field Surveys and Reconnaissance	Volume 1, Sections 1.2, 1.3, 1.4 (specifically Subsection 1.4.2.1)
		Appendix A, Sections A.5, A.6, A.7, and A.8
		Appendices B, C, and M
2	Topographic Data Development	Volume 1, Section 1.4 (specifically Subsection 1.4.2.1)
		Appendix A, Sections A.2 and A.3
		Appendix M
3	Independent QA/QC Review of Topographic Data	Volume 1, Section 1.4 (specifically Subsections 1.4.1 and 1.4.2.1)
		Appendix A, Sections A.2, A.3, A.7 (specifically Subsection A.7.5), and A.8 (specifically Subsection A.8.6)
		Appendix M
4	Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4)
		Appendix C, Sections C.1 and C.7
		Appendices E, F, G, H, and M
4A	Coastal Hazard Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.2.2)
		Appendix A, Section A.4
		Appendices B, D, and M
5	Independent QA/QC Review of Hydrologic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1)
		Appendix C, Section C.2
		Appendices E, F, G, H, and M

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications (Cont'd)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
5A	Independent QA/QC Review of Coastal Hazard Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 Appendices B, D, H, and M
6	Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsections 1.4.2.2 and 1.4.2.4) Appendix C, Sections C.3 and C.7 Appendices B, E, F, G, H, and M
7	Independent QA/QC Review of Hydraulic Analyses	Volume 1, Section 1.4 (specifically Subsection 1.4.1) Appendix A, Section A.4 (specifically Subsection A.4.7) Appendix C, Section C.5 Appendices B, E, F, G, H, and M
8	Floodplain Mapping (Detailed Riverine or Coastal Analysis)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C. 4 and C.6 Appendices K, L, and M Appendix C, Sections C.4 and C.6 Appendices K, L, and M
9	Independent QA/QC Review of Floodplain Mapping (Revised Areas)	Volume 1, Section 1.4 (specifically Subsection 1.4.2.3) Appendix C, Sections C.4 and C.6 Appendices K, L, and M

Table 5-2. Project Activities and Applicable Portions of FEMA Guidelines and Specifications (Cont'd)

Activity Number	Activity Description	Applicable Volume, Section/Subsection, and Appendix
10	Base Map Acquisition and Preparation	Volume 1, Section 1.3 (specifically Subsection 1.3.1.8) and 1.4 (specifically Subsection 1.4.3)
		Appendices A and B
		Appendices K, L, and M
12	DFIRM Production	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3)
		Appendices K, L, and M
12A	DFIRM Production (Application of DFIRM Graphic and Database Specifications)	Volume 1, Section 1.4 (specifically Subsection 1.4.3)
		Appendices K, L, and M
12B	Independent QA/QC Review of DFIRM Product Meeting FEMA Graphic and Database Specifications	Volume 1, Section 1.4 (specifically Subsections 1.4.2.3 and 1.4.3.3)
		Appendices K, L, and M
13	Preliminary DFIRM and FIS Report Distribution	Volume 1, Section 1.4 (specifically Subsections 1.4.2 and 1.4.3)
		Appendix C, Sections C.4 and C.6
		Appendices J, K, L, and M
14	Post-Preliminary Processing	Volume 1, Section 1.4 (specifically Subsection 1.4.2 and 1.4.3)
		Appendices J, K, L, and M

SECTION 6—SCHEDULE

The activities documented in this MAS shall be completed in accordance with the project schedule below. If changes to this schedule are required, the responsible Mapping Partner shall coordinate with FEMA and the other Mapping Partners in a timely manner.

ACTIVITIES	RESPONSIBLE PARTNER(S)	DATE DUE
Activity 1 – Field Surveys and Reconnaissance	MDEQ	Nov 2003
Activity 2 – Topographic Data Development	MDEQ	Nov 2003
Activity 3 – Independent QA/QC Review of Topographic Data	FEMA	*
Activity 4 –Hydrologic Analyses	MDEQ	Jan 2004
Activity 5–Independent QA/QC Review of Hydrologic Analyses	FEMA	*
Activity 6 – Hydraulic Analyses	MDEQ	May 2004
Activity 7 – Independent QA/QC Review of Hydraulic Analyses	FEMA	*
Activity 8 – Floodplain Mapping	MDEQ	Jul 2004
Activity 9 – Independent QA/QC Review of Floodplain Mapping	FEMA	*
Activity 10 – Base Map Acquisition	MDEQ	Nov 2003
Activity 12 – DFIRM Production	MDEQ	Aug 2004
Activity 12A – Application of DFIRM Graphic and Database Specifications	FEMA	*
Activity 13 – Preliminary DFIRM and FIS Report Distribution	FEMA	*
Activity 14 – Post-Preliminary Processing	MDEQ FEMA	*

* FEMA will schedule to be as soon as possible after submittal of the requisite information and data

SECTION 7—CERTIFICATIONS

The following certifications apply to this MAS:

Activity 1 (Field Surveys and Reconnaissance)

A Registered Professional Engineer or Licensed Land Surveyor will certify topographic data, in accordance with 44 CFR 65.5(c). Certification of topographic data by the American Society for Photogrammetry and Remote Sensing is also acceptable.

Activity 4 (Hydrologic Analyses). Activity 6 (Hydraulic Analyses), and Activity 8 (Floodplain Mapping)

- A Registered Professional Engineer or Licensed Land Surveyor will certify hydrologic and hydraulic analyses and data in accordance with 44 CFR 65.6(f).
- A Registered Professional Engineer or Licensed Land Surveyor will certify topographic information in accordance with 44 CFR 65.5(c).

Activity 8 (Floodplain Mapping), Activity 12 (DFIRM Production), and Activity 12A (Application of DFIRM Graphic and Database Specifications)

The DFIRM metadata files will include a description of the horizontal and vertical accuracy of the DFIRM base map and floodplain information.

Activity 10 (Base Map Acquisition and Preparation)

- A community official or responsible party will provide written certification that the digital data meet FEMA minimum standards and specifications.
- The responsible Mapping Partner will provide documentation that the digital base map can be used by FEMA.

SECTION 8—TECHNICAL ASSISTANCE AND RESOURCES

Project Team members may obtain copies of FEMA-issued LOMCs, archived engineering backup data, and data collected as part of the Mapping Needs Assessment Process from FEMA, who may be contacted by telephone at 312-408-5529 or by facsimile at 312-408-5551.

General technical and programmatic information, such as FEMA 265 and the Quick-2 computer program, can be downloaded from the FEMA Web site (www.fema.gov./mit/tsd/). Specific technical and programmatic support may be provided through the MCC; such assistance should be requested through the FEMA Project Officer specified in Section 11 of this MAS.

Project Team members also may consult with the FEMA Regional Project Officer to request support in the areas of selection of data sources, digital data accuracy standards, assessment of vertical data accuracy, data collection methods or subcontractors, and GIS-based engineering and modeling training.

Each party has caused this MAS to be executed by its duly authorized representative.

Richard C. Sorrell, P.E.
Project Manager
MDEQ

24 Sep 2003
Date

Kenneth Hinterlong
Regional Project Officer
Federal Emergency Management Agency, Region V

26 September 2003
Date

Terry Fell
Project Officer
Federal Insurance and Mitigation Administration

9-18-03
Date